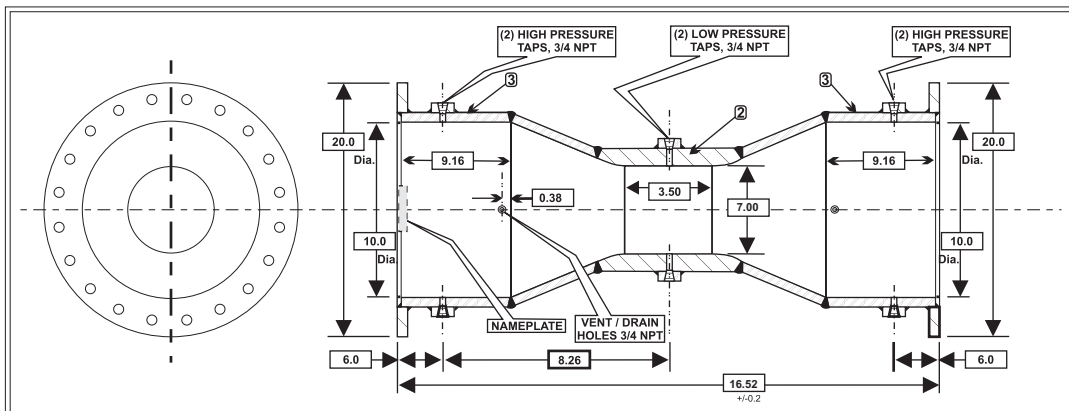


## HVT-BF Halmi Bi-Directional Fabricated Venturi-Pressure Vessel

### General Features:

- ▶ Measures rate of flow Accurately and Reliably in both directions.
- ▶ Low Permanent Pressure Loss
- ▶ Low Installed Cost
- ▶ Long Service Life (Up to 25 year warranty)
- ▶ Unaffected by downstream piping
- ▶ Custom designed for specific application
- ▶ Field verifiable
- ▶ Prompt, reliable response to your technical inquiries
- ▶ Total Support from Design through Installation and Beyond



### GENERAL DESCRIPTION:

The HVT-BF, Halmi Bi-Directional Fabricated Type Venturi primary flow element is a full performance, high accuracy and reliability differential producing flow measurement device that is based on the standard HVT- design criteria, but is specifically configured to permit flow measurement in either direction.

The fabricated-pressure vessel embodiment of the HVT design affords tremendous design and engineering flexibility because end arrangements (i. e. flanged, mechanical joint, weld end, etc.) can be combined with a variety of body materials and coatings to achieve pressure, temperature, flow range, line fluid, line size, laying length and cost objectives as dictated by the specific applications.

Incorporating the *HVT-SM Sealed Metering System* allows measurement of solids bearing (contaminated) line fluids, as well as higher viscosity liquids.

We recommend the HVT-BF be used in conjunction with such PFS products as the PFS-FM FLOWMASTER which in addition to providing traditional secondary group elements, will also provide signal discrimination to correlate flow rate indication with the proper flow direction. The PFS-IMS Intelligent metering System can further extend the intrinsic benefits of the HVT-BF by providing fully Pentium based processor discrimination, trending, analysis, control and reporting capabilities.

### APPLICATIONS:

The HVT-BF, is designed to measure full pipe, clean gasses or liquids over extreme temperature and/or pressure ranges, and this design can measure contaminated and/or solids bearing liquids. Typical applications include process control of two or more source materials, intermixing of gases from two or more generators, selective batching and custody transfer of liquids or gasses between two users.

### MATERIALS OF CONSTRUCTION:

Due to the fabricated design of the HVT-BF, the flow element can be constructed using any weldable and machinable material(s). Typically materials can be mixed to balance economy with process considerations such as all S/S HVT-BF with Monel entrance section for particle impingement considerations in high velocity oxygen service. A list of suitable materials includes but is not limited to:

Carbon Steel	Chrome Moly	Inconel
316 Stainless Steel	Aluminum	Zirconium
304 Stainless Steel	Hastelloy B & C	Titanium
Duplex S/S	Monel	Tantalum

### DESIGN AND MANUFACTURING STANDARDS:

- All materials are mill certified and of first quality.
- All applicable codes and standards are considered such as section 8 of the Boiler and Pressure Vessel Code as well as ASME B31.1 and 31.3. ASME fluid meters, MFC-3M-1985, ISO 5167, BS-7045, compliant.
- Designed for use between raised face, flat faced, ring joint or van stone flanges of any flange rating of either U. S. or foreign standards.

### PRODUCT SPECIFICATIONS:

#### Accuracy:

+/- 0.50% of actual reading (2 Sigma)

+/- 0.25% of actual reading or better based on hydraulic calibration.

#### Range Ability:

100:1 or more depending on secondary group capabilities and arrangement.

#### Operating Conditions:

Line Fluid Capability:

*Gas or liquid full pipe flow.*

*Clean with minimal particulate contamination.*

*HVT-SM Sealed System accommodates contaminated flow applications.*

Temperature Range:

*Cryogenic to Superheated Steam.*

*-400° F to 1250° F (as limited only by the materials of construction and capabilities of the associated secondary device(s) used.)*

Line Pressure Capacity:

*From full vacuum to the limits of materials.*

#### Line Size Capability/End Arrangement:

Unlimited, between 3/8" through 144" in service.

Flange ends, weld end, plain, mechanical joint, or other as required.

#### Beta Ratio Capability:

Custom sized and designed for Beta ratio range between 0.30 through 0.75.

#### Pipe Reynolds Number $R_D$ Capability:

Discharge coefficient is constant above 75,000  $R_D$ .

Discharge coefficient bias and random error between 12,000  $R_D$  and 75,000  $R_D$  is empirically established and highly repeatable.

#### Permanent Pressure Loss:

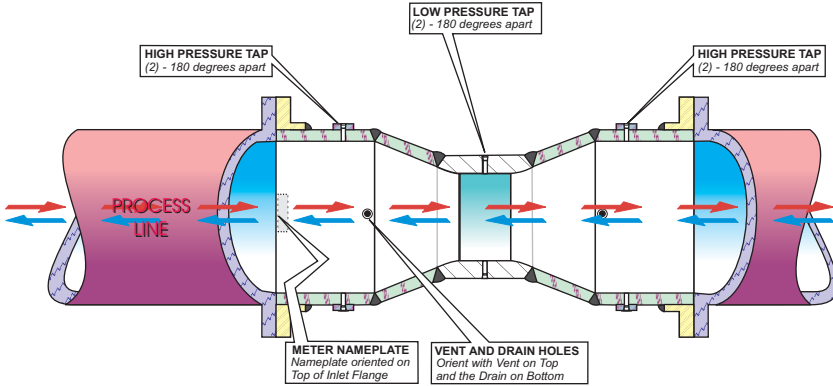
Varies from 6% of differential and up depending on application conditions, beta ratio, and exit cone truncation ratio, and can be engineered to meet your requirements

PLEASE NOTE: Use this data as general application guidance for the equipment and/or services referenced herein. Users may reasonably expect this disclosure to constitute an accurate factual representation at the time of publication, however all data and specifications contained herein are subject to change without prior notice. This is not a contractual obligation of PFS, Inc. Primary Flow Signal, Inc. is bound SOLELY by its official SUBMITTAL document when presented in connection with an actual purchase and sale transaction, which SUBMITTAL shall form the controlling representation of any product or service claimed by Primary Flow Signal, Inc.

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## INSTALLATION INFORMATION

Typical Installation Arrangement for HVT-Pressure Vessel Bi-Directional Type Venturi



### The Proper Method of Installing a Halmi Bi-Directional Venturi Meter

PRESSURE VESSEL DESIGN

- Item 1: This is a high quality flow meter! Handle with care during installation.
- Item 2: If improperly installed, it must be reinstalled!
- Item 3: If damaged, it must be replaced!
- Item 4: Handle it from its outside ONLY!
- Item 5: Do not damage its inside!
- Item 6: Meter installation is not dependent on the direction of flow in process pipe line.
- Item 7: Orient Pressure Taps HORIZONTALLY!
- Item 8: Provide necessary clearances as deemed practical for installation, inspection and maintenance!
- Item 9: Tighten flange bolts according to typical industry flange assembly standards, adequate to prevent leakage from connection.
- Item 10: Tolerances should be within industry standards for these installation instructions!

Metering Section is in  
PLAN VIEW  
LOOKING DOWN  
ON TOP OF METER

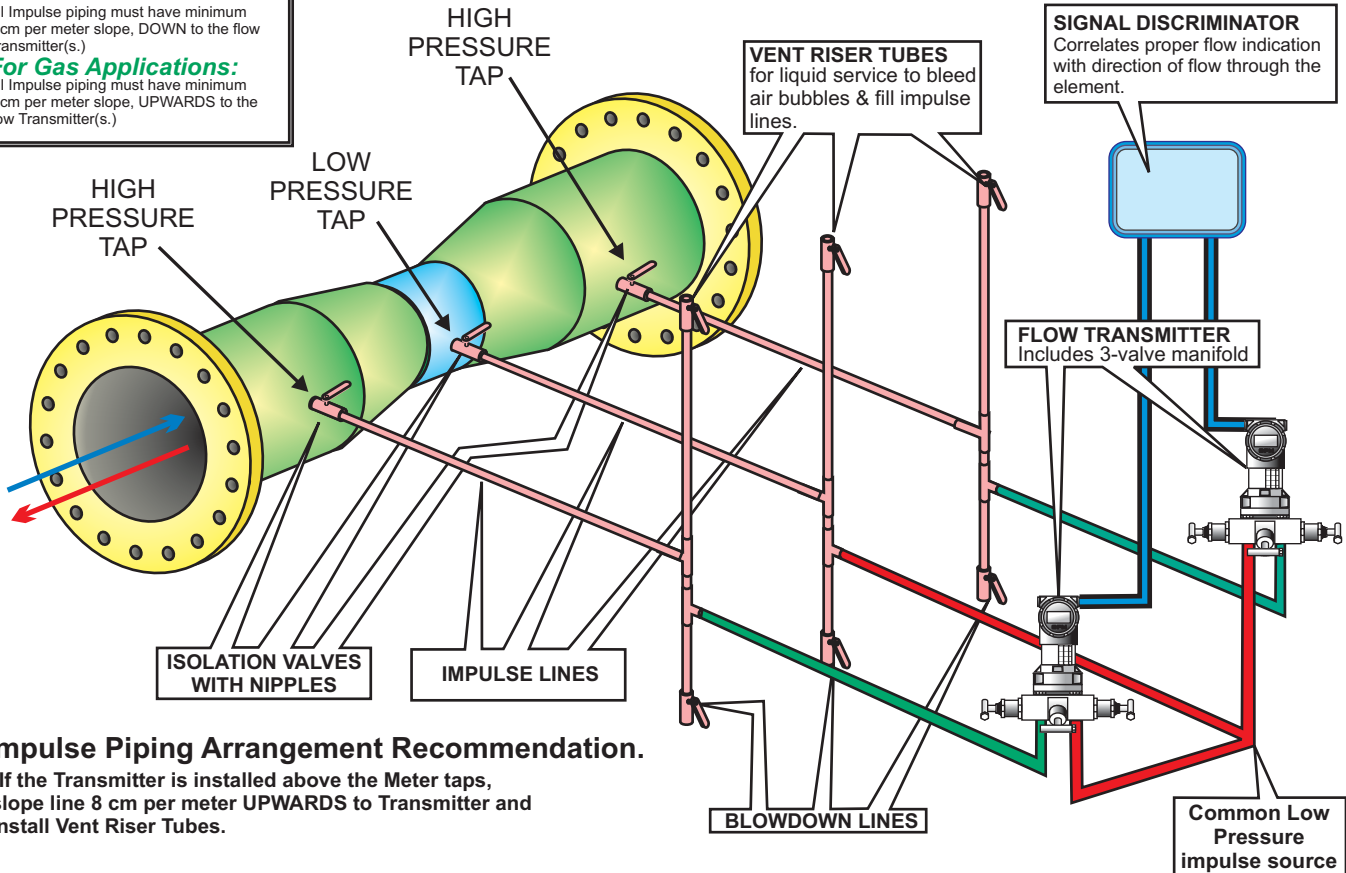
---FAILURE TO FOLLOW INSTALLATION DIRECTIONS MAY VOID WARRANTY!---

**GENERAL NOTE:**  
**\*For Liquid Applications:**

All Impulse piping must have minimum 8 cm per meter slope, DOWN to the flow Transmitter(s).

**For Gas Applications:**

All Impulse piping must have minimum 8 cm per meter slope, UPWARDS to the flow Transmitter(s).



### Impulse Piping Arrangement Recommendation.

\*If the Transmitter is installed above the Meter taps, slope line 8 cm per meter UPWARDS to Transmitter and install Vent Riser Tubes.

